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Contents of a Nest of the Desert Ant, *Pheidole grallipes* Wheeler, in Baja California, México

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Abstract.—Nest contents of the desert ant, *Pheidole grallipes* Wheeler, sampled from a crack in granitic rock in the Central Desert of Baja California, México, were analyzed to inventory: number, weight, caste, and life stage of *P. grallipes*; number and kinds of associated arthropods; and composition of food items. Major workers, although they made up only 2% of the nest population, comprised 31% of the ants' biomass. Guests included Coleoptera (adults and larvae) and other arthropods. A variety of plant material was present, including leaves, stems, and flowers. A high number (250) of seeds of the California poppy, *Eschscholzia californica,* was found, as well as 54 fruits from the same species. Contents suggest that *P. grallipes* may be granivorous as well as entomophagus.

Resumen.—El contenido de un nido de la hormiga desierta, *Pheidole grallipes* Wheeler, se cató de una grieta en una roca de granito en el Desierto Central de Baja California, México, se analizeó para determinar estas cosas: el número, el peso, la casta, y las etapas de la vida de *P. grallipes*; el número y las clases de los arthópodos asociados; y la composición de los alimentos. Los trabajadores mayores, aunque solamente 2% de la población del nido, comprendieron 31% de la biomasa de las hormigas. Los convidados incluyeron Coleóptero (las adultos y las larvas) y otros arthópodos. Una variedad de material de plantas estaba presente incluyente las hojas, los tallos y las floras. Pasmosamente, un número elevado de *Eschscholzia californica* (la semilla) se encontró y también las frutas de la misma especie. El contenido sugere qué *P. grallipes* sea granívoro y también entomófago.

Nest contents of the desert ant, *Pheidole grallipes* Wheeler, were sampled from a granitic crevice in the Central Desert of Baja California, México, by Clark and Blom, 11 April 1978, to determine the food items and myrmecophiles. The collection was made 9 km NW Rancho Santa Inés, a midpeninsular location (Lat. 28°46′N, Long. 114°46′W, Elevation 550 m). The area is a boulder field with sandy soil and scattered vegetation. Average precipitation is 85–100 mm and average temperatures for January are 10–18°C and for July and August 20–29°C

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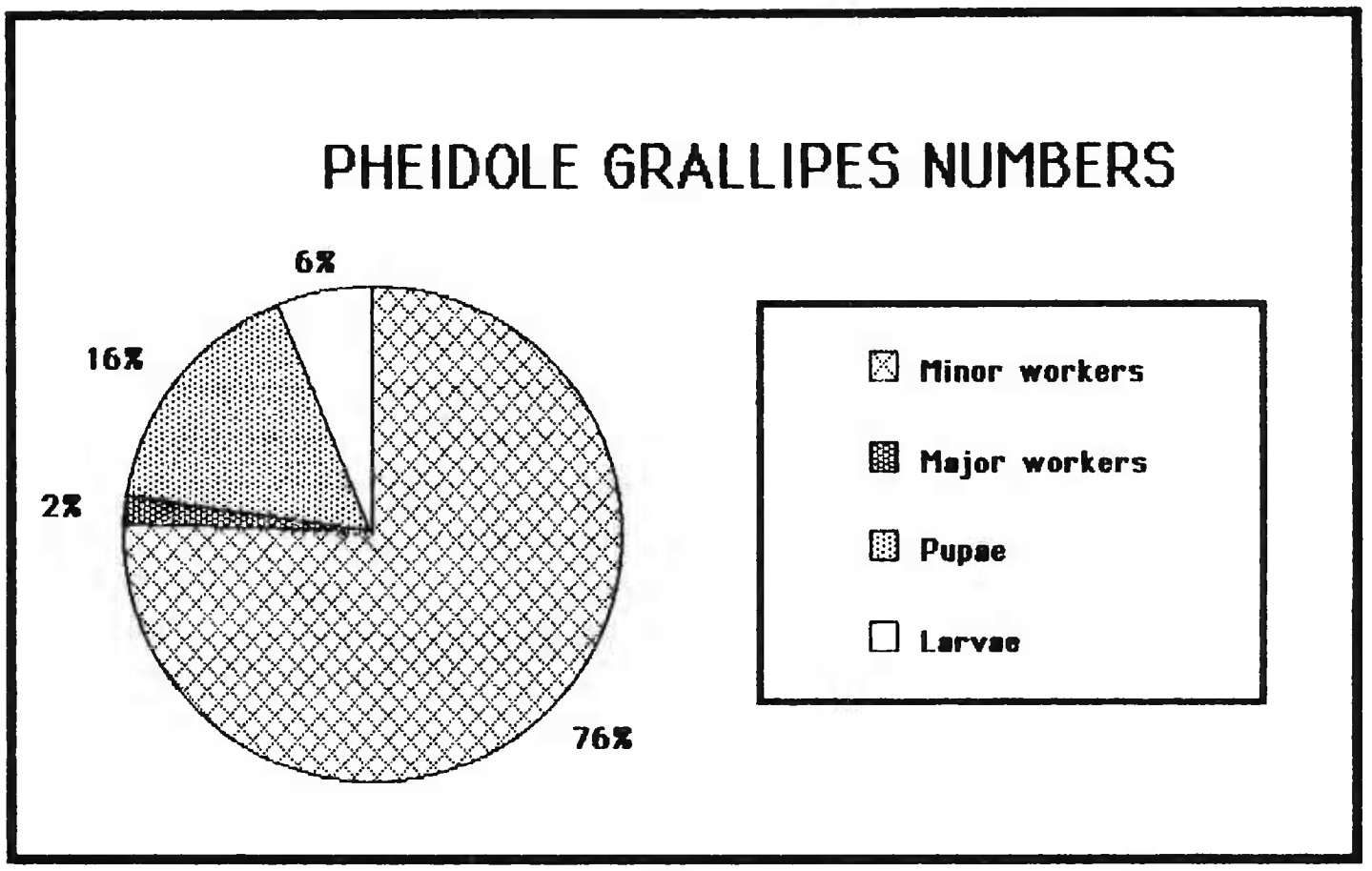

Figure 1. Distribution of stages and castes of *Pheidole grallipes* from a nest in the Santa Inés area, Baja California, México, 11 April 1978.

(Hastings and Humphrey, 1969). Dominating the landscape are granite boulders, the boojum, barrel and cardon cactus. For more detailed description see Blom and Clark (1980, 1984). The *P. grallipes* nest was extracted from a crack, 50 cm in depth and 30 cm in length. Field observations recorded the presence of several species of live arthropods in the nest in addition to the ants.

Materials and Methods

Using hand tools the rock crack was split apart as far as possible. All ants and other live arthropods encountered were collected to alcohol with aspirators and forceps. Dry contents were sampled with plastic vials and stored for later sorting.

The ants were inventoried to determine the number of minor, callow minor, and major workers; pupae; and larvae within that sample. Weights for each category were measured with a Sartorius analytical balance.

Results and Discussion

The nest was in a rock crack which when excavated was found to be 50 cm deep and 30 cm long. Other nests of *P. grallipes* at this site also appear to be associated with rock cracks. Mallis (1941) reported a nest of the species located in sandy soil at the base of a shrub in southern California.

Minor workers far outnumbered major workers. There were 568 minors, 37 callow minors (for a total of 605 minor workers, 76%), compared to 16 majors (2%), 123 pupae (16%), and 49 larvae (6%) (Fig. 1).

While major workers comprised only 2% of the nest's ant population, their weight (mean 22 mg) comprised 31% of the ants' biomass; and minor workers (less callows), with 5% of the ant biomass (mean = 1.0 mg), totaled 71% of the

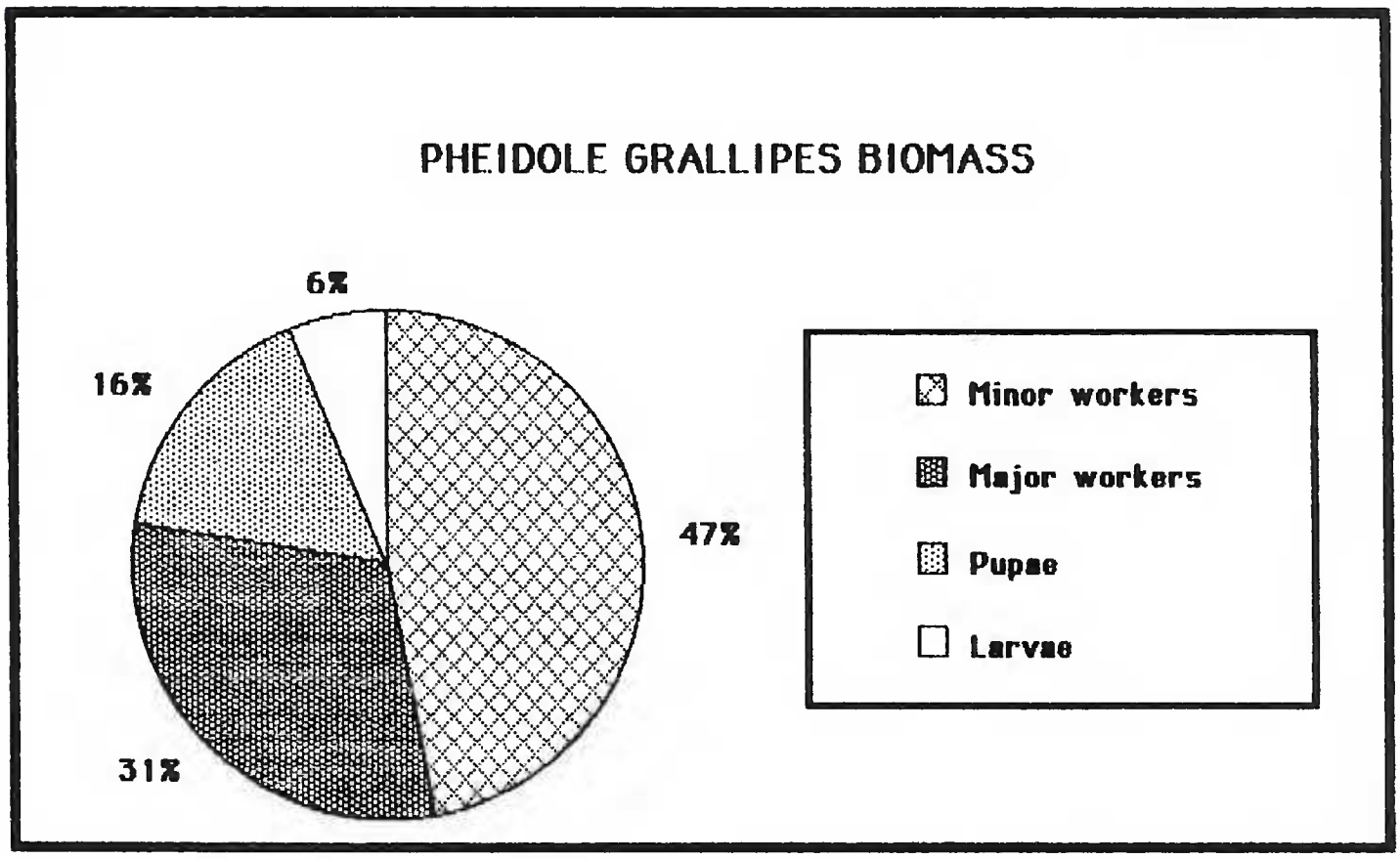

Figure 2. Distribution of biomass within the stages and castes of *Pheidole grallipes* from a nest in the Santa Inés area, Baja California, México, 11 April 1978.

nest's ant population. Callow workers (mean = 1.0 mg) formed 3% of the biomass, while pupae and larvae were collectively 15%. The function of the major workers is unknown, but it must be important for the colony to have such an energy investment. Usually only the minor workers are observed foraging.

Myrmecophiles included the following Tenebrionidae: *Conibius opacus* (LeConte) (7); *Araeoschizus* sp. (prob. *antennatus*) (2), and *Argoporis a. apicalis* Blaisdell (3), and 11 larvae. *Araeoschizus* sp. has also been reported as a guest of this ant in southern California (Wheeler and Wheeler, 1973). Papp (1981) reported *Araeoschizus antennatus* Blaisdell from one of our non-ant associated collections at this locality. One scorpion (*Vejovis* sp.) was also found in the rock crack. Its relationship with the ants is unknown.

Animal material consisted mainly of exoskeletons of Coleoptera, Tenebrionidae; Diptera; and Hymenoptera, Formicidae. Most ant fragments were of *P. grallipes* individuals and probably do not represent food items. Tenebrionidae and other Coleoptera comprise the largest portion of this component, though it is difficult to say how much of this can be considered food.

There was a variety of vegetative material in the nest. Leaves, stems and flower parts were found. It is always possible for material of this sort to be carried into the nest by the ants for purposes other than food, or for its deposition by wind; however, the accumulation of 250 seeds of the California poppy, *Eschscholzia californica* Cham., and 54 of its fruits seemed more than accidental. *E. californica* var. *peninsularis* (Green) Munz is known from the Cataviña area (Santa Inés area) in the Central Desert (Wiggins, 1980). The seeds are small and round. Among other materials were 8 seeds of a leguminous species.

Other ants nesting in the immediate vicinity include a new species of *Pheidole* (10 m distant), *Pheidole yaqui* Creighton and Gregg (12 m), *Crematogaster depilis*

(15 m), and *Pogonomyrmex tenuispina* Forel (16 m) (Blom and Clark, 1980). Of these species all but *Crematogaster depilis* are known seed harvesters. *C. depilis* gathers extrafloral nectar (Blom and Clark, 1980).

Pheidole grallipes is a species thought to be exclusively entomophagus (Pullen, 1961), though Blom and Clark (1980) have since recorded it as a frequent visitor to the extrafloral nectaries of the barrel cactus, *Ferocactus gracilis* Gates. No previous evidence has established *P. grallipes* as a seed foraging species, though the genus is considered granivorous (Wheeler and Wheeler, 1973; and others). With examination of these nest contents it appears *P. grallipes* may be a diversified feeder utilizing both animal and plant (seed and nectar) resources.

Acknowledgments

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